VERMONT

AGENCY OF NATURAL RESOURCES

DEPARTMENT OF FORESTS, PARKS AND RECREATION

STATE OF VERMONT

FOREST INSECT AND DISEASE CONDITIONS

SOUTHERN REGION

CALENDAR YEAR 1989

PREPARED BY: Barbara S. Burns, Specialist
Forest Resource Protection

John P. Barrows
Allan D. Sands
Forest Resource Protection
Technicians

INTRODUCTION

The information in this report is based on aerial surveys to detect defoliation, dieback and mortality; as well as ground surveys and observations of Forest Resource Protection personnel and other forestry staff.

Aerial surveys were flown in June (6/12) to detect thrips defoliation, and mid-season (7/26 and 7/27). U. S. Forest Service personnel flew over the Green Mountain National Forest.

Diagnostic assistance was provided by the University of Vermont, Vermont Department of Agriculture, the U. S. Forest Service, Penn State University, the University of Massachusetts, Cornell University and the Boyce Thompson Institute.

WEATHER SUMMARY

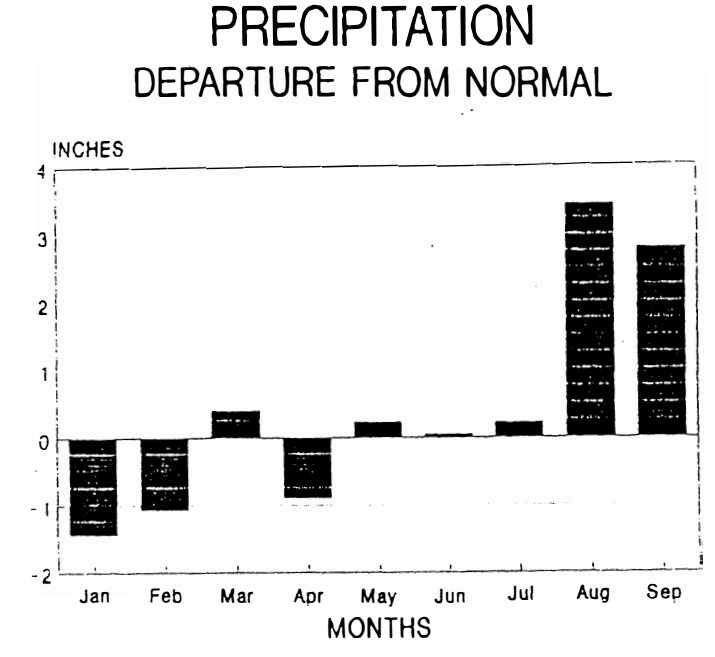
In the winter of 1988-89 there was little or no snow cover. Although temperatures were generally average or above average, soil was frozen at least 6" deep throughout the region in the wood, and up to 6' deep in open land.

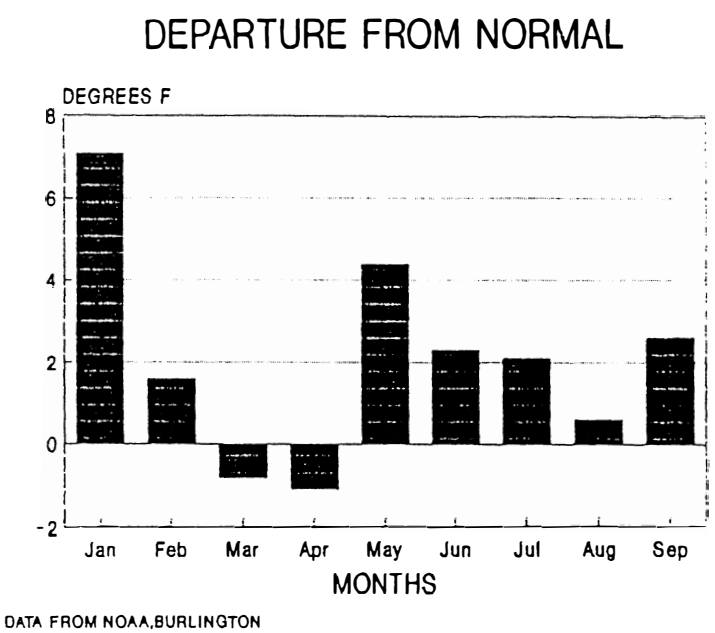
Spring began normally, and progressed quickly. The growing season was generally warm with above average precipitation. The foliage was generally lush; refoliation was unusually quick in defoliated areas. Periods of rain in June and mid-August preceded the widespread development of fungus diseases.

High winds and heavy rain in late September knocked foliage off early at high elevations, but, elsewhere, autumn foliage was colorful and persisted through most of October.

Weather for the season is summarized in Figure 1 and 1a. Phenology observations are summarized in Table 1.

Figure 1. 1989 Weather Summary.





DATA FROM NOAA,BURLINGTON

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Figure 1a. Precipitation recorded at North Springfield Dam.

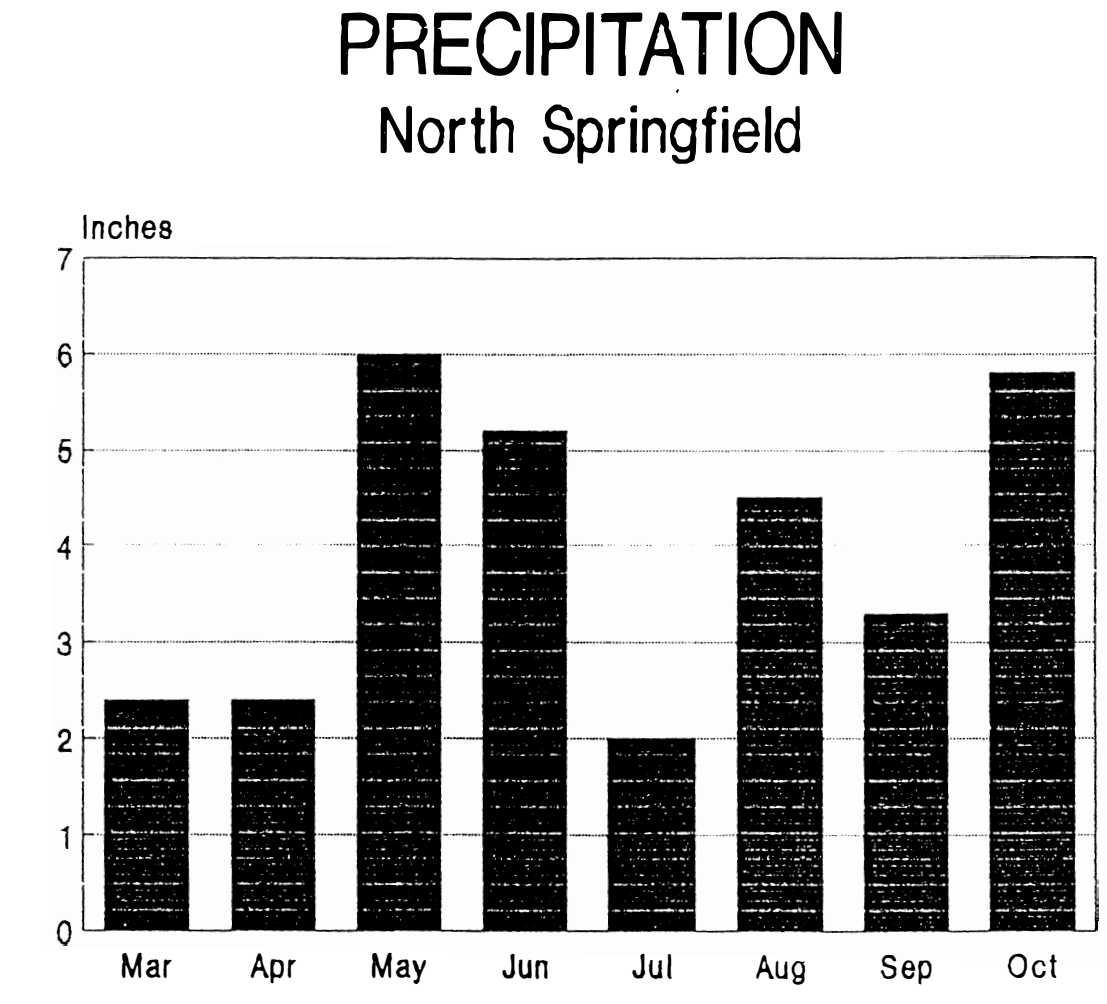

Table 1. 1989 Growing Degree Days and Observations of Phenological Development.

Week Ending	Growing Degree Days*				Phenology**				
	Burlington		Albany		Sugar Maple	Other Plants			Misc.
	1989	(Normal)	1989	(Normal)		Budswell	Leaves	Flowers	
4/19	45					Red Maple		Silver Maple Popple	
4/16	48				Budswell				
4/23	65							Red Maple Elm	Thrips
4/30	89		161		First leaves		Rubus Trout Lily Trillium	Hepatica Coltsfoot Violet	Eastern Tent Caterpillar Nest
5/7	135		210		Buds still present	Spruce	Larch Red Maple	Shadbush Spring Beauty	
5/14	189		258		Leaves 1-2" Flowers	Red Oak White Ash	Cherry Willow Beech Ironwood	Birch Jack-in-the Pulpit	
5/21	314	(188)	380	(227)	Leaves full size	Hemlock	Red Oak Chesnut White Pine	Blueberry	Gypsy moth 2nd instar
5/28	396	(236)	466	(282)					
6/4	519	(326)	599	(380)					Green up complete

* 86/50 Calculations from UVM Extension Service Entomology and Plant Pathology News or based on NOAA Local Climatological Data.

** Observations from Connecticut River Valley south of White River Junction.

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FOREST INSECTS

Hardwood Defoliators

Forest Tent Caterpillar, *Malacosoma disstria*, was seen throughout. No defoliation was observed. Pheromone traps were placed in three locations this year. Results will be summarized in the northern regional report. Defoliation is expected in Windsor and Windham Counties in 1990.

Gypsy moth, *Lymantria dispar*, populations exploded with 15,540 acres defoliated. (Table 2, Map 1). Refoliation occurred rapidly in defoliated areas.

Gypsy moth populations were affected by the fungus *Entomophaga maimaiga*, which was introduced to the Boston area from Japan in 1910-1911. Cadavers from throughout the region were confirmed as being infected with the fungus by Ann Hajek at the Boyce Thompson Institute and Joe Elkinton at the University of Massachusetts (Map 1a). Mortality data was taken at one site (Fort Dummer) where 44% of the larvae and pupae were killed.

Larval mortality was observed even where poulations were still at low levels. Wet conditions are thought to have been responsible for the epizootic. Most dead caterpillars were observed hanging from rear prolegs, and fell apart when handled. On some trees, dead larvae covered the lower 2-4' of the trunk.

Egg mass counts were continued in banded focal area plots (Table 3) although larval and pheromone trap counts were discontinued.

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Table 2. Mapped acres of defoliation by gypsy moth.

Town	Damage Level		Total Acres
	Moderate	Heavy	
Benson	2010	300	2310
Castleton	1200	700	1900
Fair Haven	2400	380	2780
Brandon	600	-	600
Hubbardton	900	620	1520
Ira	-	90	90
Pawlet	-	120	120
Proctor	-	110	110
Pittsfield	-	250	250
Sudbury	1800	-	1800
Wells	-	410	410
West Rutland	-	210	210
Rutland Town	400	700	1100
West Haven	1650	180	1830
Total: Rutland County	10960	4070	15030
Sandgate	-	360	360
Total: Bennington County	-	360	360
Rockingham	-	50	50
Townshend	-	100	100
Total: Windham County	-	150	150
Total: Southern Vermont	10960	4580	15540

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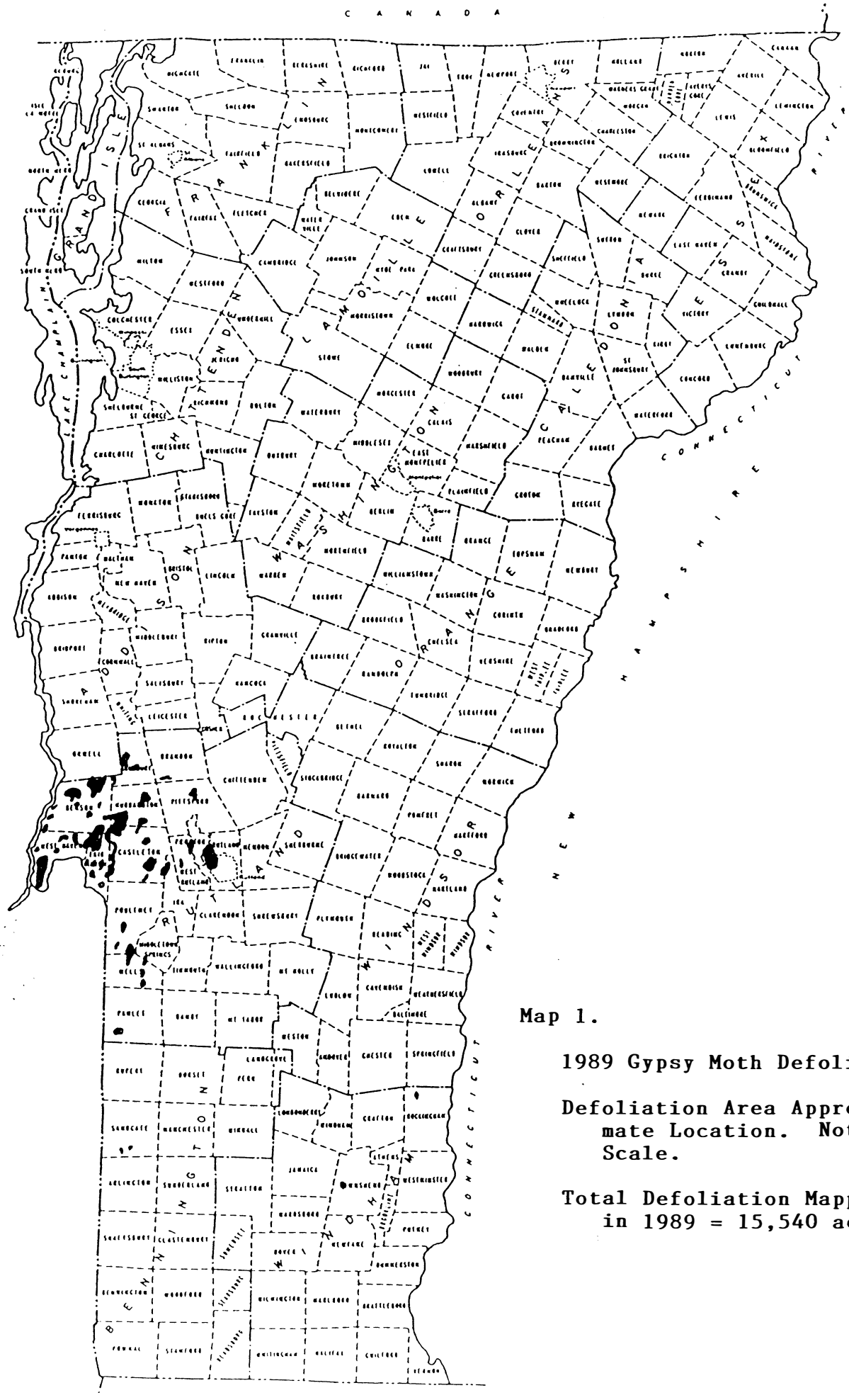
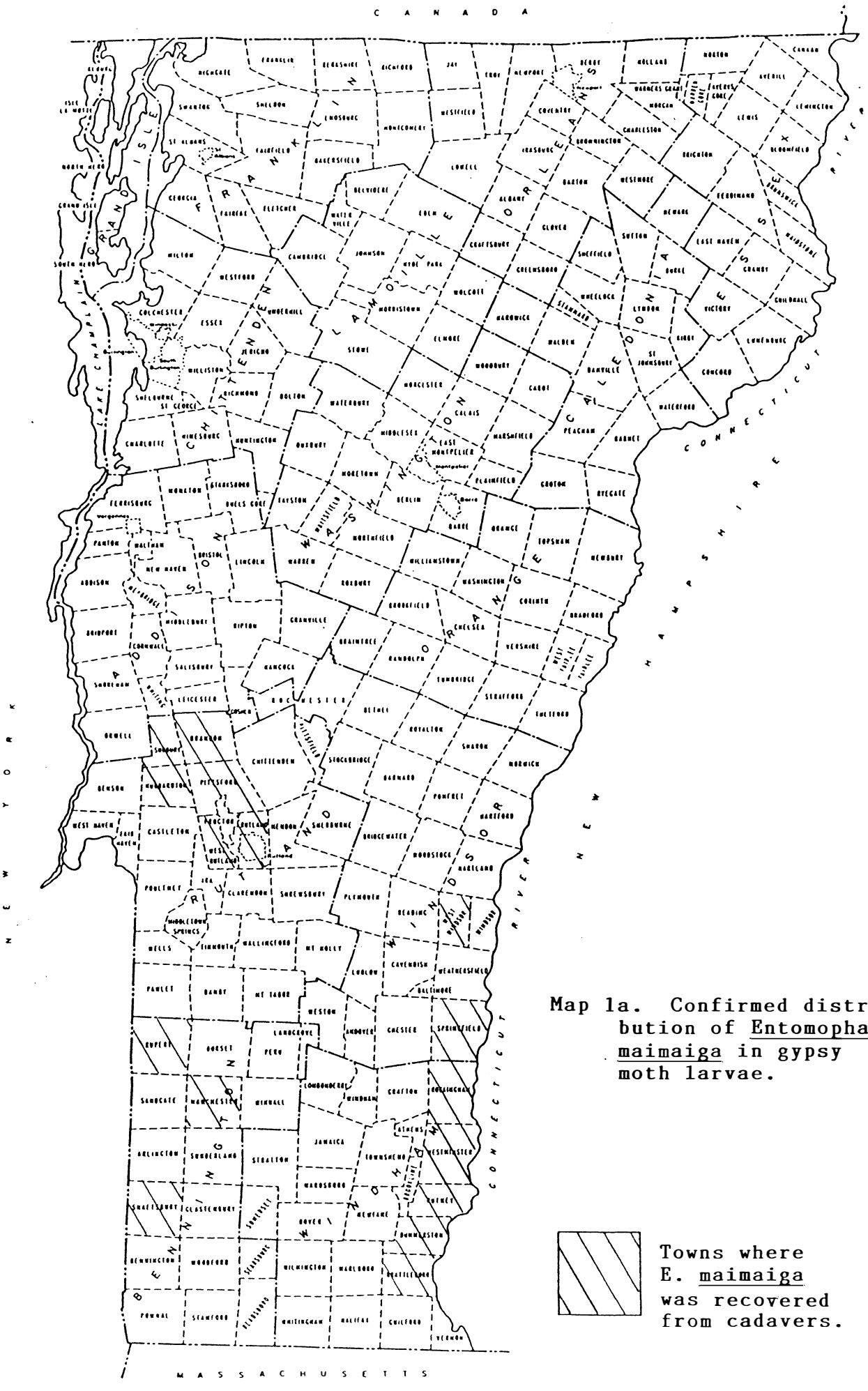


Map 1.

1989 Gypsy Moth Defoliation

Defoliation Area Approximate Location. Not to Scale.

Total Defoliation Mapped in 1989 = 15,540 acres.



Map 1a. Confirmed distribution of Entomophaga maimaiga in gypsy moth larvae.

Towns where E. maimaiga was recovered from cadavers.

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Table 3. Gypsy moth egg mass counts from focal area monitoring plots 1986-1989.*

Plot Location	1986	1987	1988	1989
Minards Pond	0	0	7	99
Fort Dummer	2	0	1	1
Handley Mountain	1	1	4	417
Perch Pond	0	115	226	168
Rocky Pond	0	6	53	>400
Petersburg	1	0	1	296
Tate Hill	0	0	6	498

* Total number in 15m diameter plots; average of 2-3 plots in 1986 and 2 plots in 1987-1989.

In general, egg mass counts and observations indicate that populations will be at outbreak levels through most of the region next year. In many areas, including Castleton, Rutland, Benson, and Rockingham, egg masses are small, and parasitism by Ooencyrtus kuwanai is heavy. Elsewhere, including Arlington, Sandgate, Brandon, Pittsford and West Haven, egg masses appear normal. Extensive defoliation is expected in 1990, unless the fungus disease and parasitism have substantially reduced egg viability.

Oak Leaf Tier, Croesia semipurpurana, was not observed this year. Traps in Rupert, Rockingham and Brattleboro did not catch any moths. Larvae collected from webbed red oak foliage in Rockingham were not oak leaf tier, as determined by John Anhold of the U. S. Forest Service - Forest Pest Management.

Saddled Prominent, Heterocampa guttivata, populations continued to increase, with 280 acres of known defoliation (Weston - 50 A, Andover- 180 A, Sharon - 50 A) (Map 1b). Larvae were seen throughout, with "raining" frass common.

Fall pupal counts were made in Weston and Shrewsbury (Table 4).

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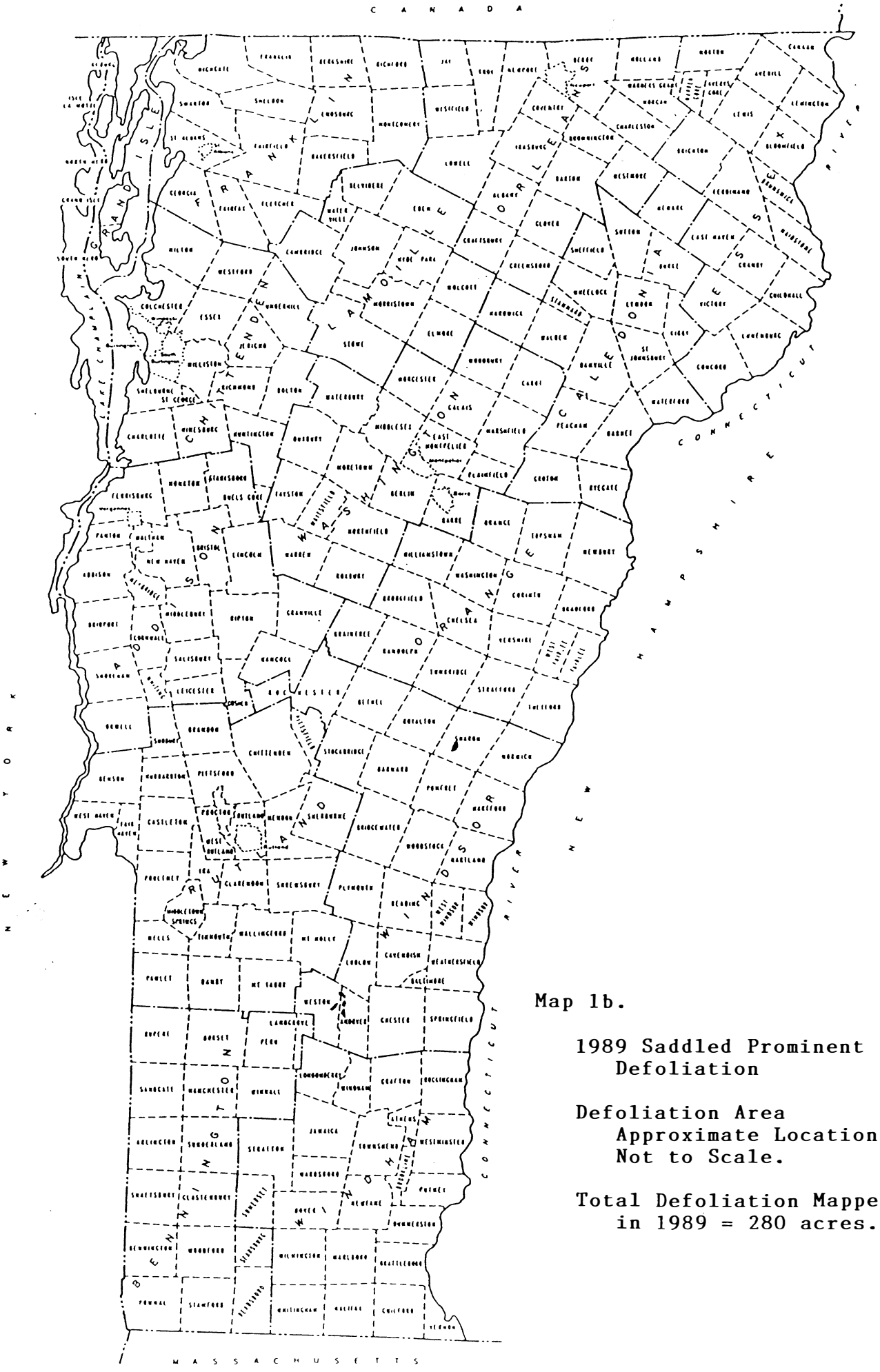

Map 1b.

1989 Saddled Prominent Defoliation

Defoliation Area Approximate Location. Not to Scale.

Total Defoliation Mapped in 1989 = 280 acres.

Table 4. Number of saddled prominent pupue found in fall samples, 1987-1989.

Location	Live Pupae/Ft			Pupal Skins/Ft		
	1987	1988	1989	1987	1988	1989
Shrewsbury - Forest	0.3	1.7	1.0	0.6	0.6	0.2
Sugarbush	0.3	0.6	0.7	0.2	1.1	0.5
Weston - Heavy Defoliation	-	-	0.3	-	-	1.1
Light Defoliation	-	-	0.3	-	-	0.2

Low numbers of live pupae indicate that defoliation should not occur in these areas next year. Mortality of pupae collected from Wilmington was associated with a fungus closely related to Entomophaga maimaiga (as determined by Ann Hajek, Boyce Thompson Institute), which may further reduce populations in some areas.

OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Birch Leaf Folder *Ancylis discigerana*	Yellow Birch	Hancock	Few.
Birch Leaf Miner *Fenusa pusilla*	White Yellow & Grey Birch	Throughout	Not as heavy as 1988.
Birch Skeletonizer *Bucculatrix canadensisella*	Yellow Birch	Chittenden	Few.
Bruce Spanworm *Operophtera bruceata*			Not observed.
Eastern Tent Caterpillar *Malacosoma americanum*	Apple Cherry	Roadside Hedgerows Throughout	Widespread on roadside & hedgerow trees. Not as heavy as 1988.
Elm Leaf Beetle *Pyrrhalta luteola*	Elm	Rutland Fair Haven	Shade trees.
Fall Cankerworm *Alsophila pometaria*			Not observed.
Fall Webworm *Hyphantrea cunea*	Hardwoods	Widespread	Noticeable, but less common than 1988.
Flat Leaf Tiers *Psilocorsis* sp.	Red Oak	Rockingham	Understory trees.

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OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Forest Tent Caterpillar *Malacosoma disstria*			See narrative.
Green Striped Mapleworm *Anisota rubicunda*	Sugar Maple	Shrewsbury Sharon	Individual larvae.
Gypsy Moth *Lymantria dispar*			See narrative.
Half Winged Geometer *Phigalia titea*			Not observed.
Large Aspen Tortrix *Choristoneura conflictana*			Not observed.
Linden Looper *Erranis tiliaria*			Not observed.
Locust Leaf Miner *Odontata dorsalis*	Black Locust	Putney	Damage has been declining since 1987.
Maple Leaf Cutter *Paraclemensia acerifoliella*	Sugar Maple	Throughout	Increasing. Moderate damage in Quechee, Shaftsbury, Danby and Sherburne.
Maple Trumpet Skeletonizer *Epinotia aceriella*	Sugar Maple	Throughout	Heavier than 1988.

OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Maple Webworm *Tetralopha asperatella*			Not observed.
Mountain Ash Sawfly *Pristophora genicultata*			Not observed.
Oak Leaf Tier *Croesia semipurpurana*			See Narrative.
Orange-humped Mapleworm *Symmerista leucitys*	Sugar Maple	Proctor	Shade tree.
Pin Oak Sawfly *Caliroa sp.*			Not observed.
Saddled Prominent *Heterocampa guttivata*			See narrative.
Satin Moth *Leucoma salicis*	Poplar	Castleton Rockingham Rutland Windsor	Causing defoliation in Brownsville area.
Solitary Leaf Roller *Sparganothis pettitana*			Not observed.
Spring Cankerworm *Paleacrita vernata*			Not observed.
Uglynest Caterpillar *Archips cerasivoranus*			Not observed.

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SOFTWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Arborvitae Leaf Miner Argyresthia thuiella	Arborvitae	Ludlow Marlboro Rutland	Ornamentals.
Balsam Fir Sawfly Neodiprion abietis	Blue Spruce	Springfield	Ornamentals.
Green Hemlock Needleminer Coleotechnites apicitripunctella	Hemlock	Quechee	Light defoliation of ornamentals.
Gypsy Moth Lymantria dispar	White Pine White Spruce	Springfield Dummerston	Light defoliation of Christmas trees and ornamentals.
Hemlock Looper Lambdina fiscellaria fiscellaria	Hemlock	Hubbardton	Individual larva.
Introduced Pine Sawfly Diprion similis	White Pine	Rutland Mendon	Ornamentals.
Larch Casebearer Coleophora laricella	Larch	Rutland & Bennington Counties	Approximately 1000 acres defoliated.
Larch Sawfly Pristophora erichosonii	Larch	Rutland	Ornamentals.
Microbagworm Psychidae	Balsam Fir	Pownal	Occasional cases.

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SOFTWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Orange Spruce Needleminer *Pulicalvaria piceaella*	Balsam Fir	Weston	Light defoliation of Christmas trees.
Red-Headed Pine Sawfly *Neodiprion lecontei*			Not observed.
Spruce Bud Moth *Zeiraphera canadensis*			Not observed.
Spruce Budworm *Choristoneura fumiferana*			Not observed.
Spruce Coneworm *Dioryctria reniculella*	White Spruce	Pownal	Possible cause of curly shoots.
White Pine Sawfly *Neodiprion pinetum*			Not observed.
Yellow-headed Spruce Sawfly *Pikonema alaskensis*			Not observed

SAPSUCKING INSECTS, MIDGES, AND MITES

Aphids, Periphyllus spp. (probably P. americanus and P. testudinaceus) populations dropped dramatically in most areas on developing sugar maple buds and leaves (Table 5). High populations were seen in one stand in Rupert.

Table 5. Total number of Periphyllus aphids per 100 buds in 6 sugarbushes: 1987-1989.

Location	1987	1988	1989
Woodstock	-	184	2
Landgrove	-	200	16
Smokey House	-	38	3
Danby	3	48	1
Sunderland	559	101	8
Dummerston	262	3	0
Regional Average	275	96	5

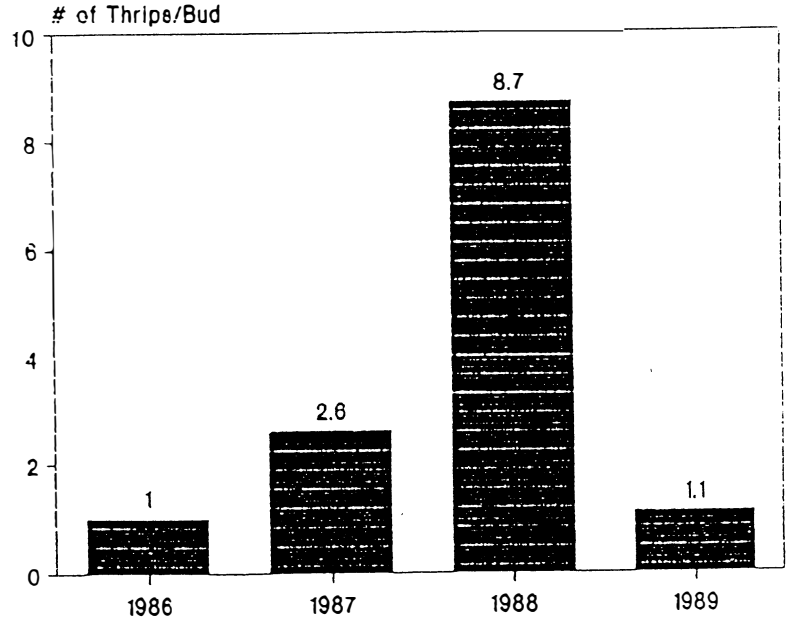
Hemlock Woolly Adelgid, Adelges tsugae, has not been observed in Vermont. It has not been detected during a systematic survey in southern Vermont now being conducted in cooperation with the U. S. Forest Service - Forest Pest Management. The region was divided into 34 100-square-mile blocks; at least one hemlock stand is being sampled per block. To date, 31 stands have been sampled (Map 2).

Pear thrips, Taeniothrips inconsequens, caused only light damage in the region, with no defoliation detectable during aerial surveys. The change from 1988's extensive damage is attributed to rapid spring leaf-out and a drop in insect numbers, as detected in bud sampling plots (Figure 2).

Foliage looked healthy on trees which were defoliated in 1987 and 1988. Root starch testing was continued in some sugarbushes. In general, trees with heavy defoliation in 1988 had levels of starch similar to non-defoliated trees, by the end of the same season (1988). Starch levels improved, regionwide, in 1989, regardless of defoliation history (Figure 3).

Additional pear thrips activities, of which there were many, will be described in the statewide report.

Figure 2. Average thrips counts in sugar maple buds* and mapped thrips defoliation acreage 1986-1989.



Acres Defoliated	<100	21,800	469,000	2,400

* Average of 2 sugarbushes in 1986 and 6 sugarbushes 1987-1989 (100 buds/sugarbush).

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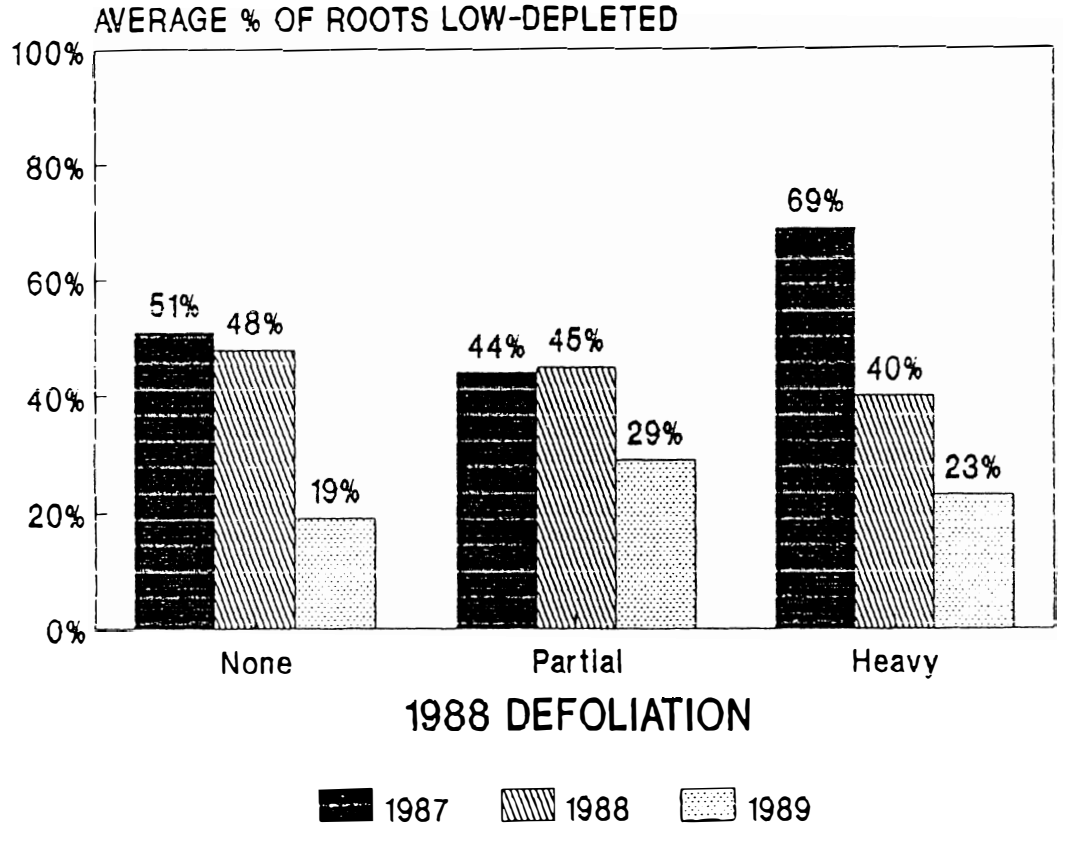
Figure 3. Average sugarbush root starch ratings, 1987-1989, by level of pear thrips defoliation in 1988 (n=20).



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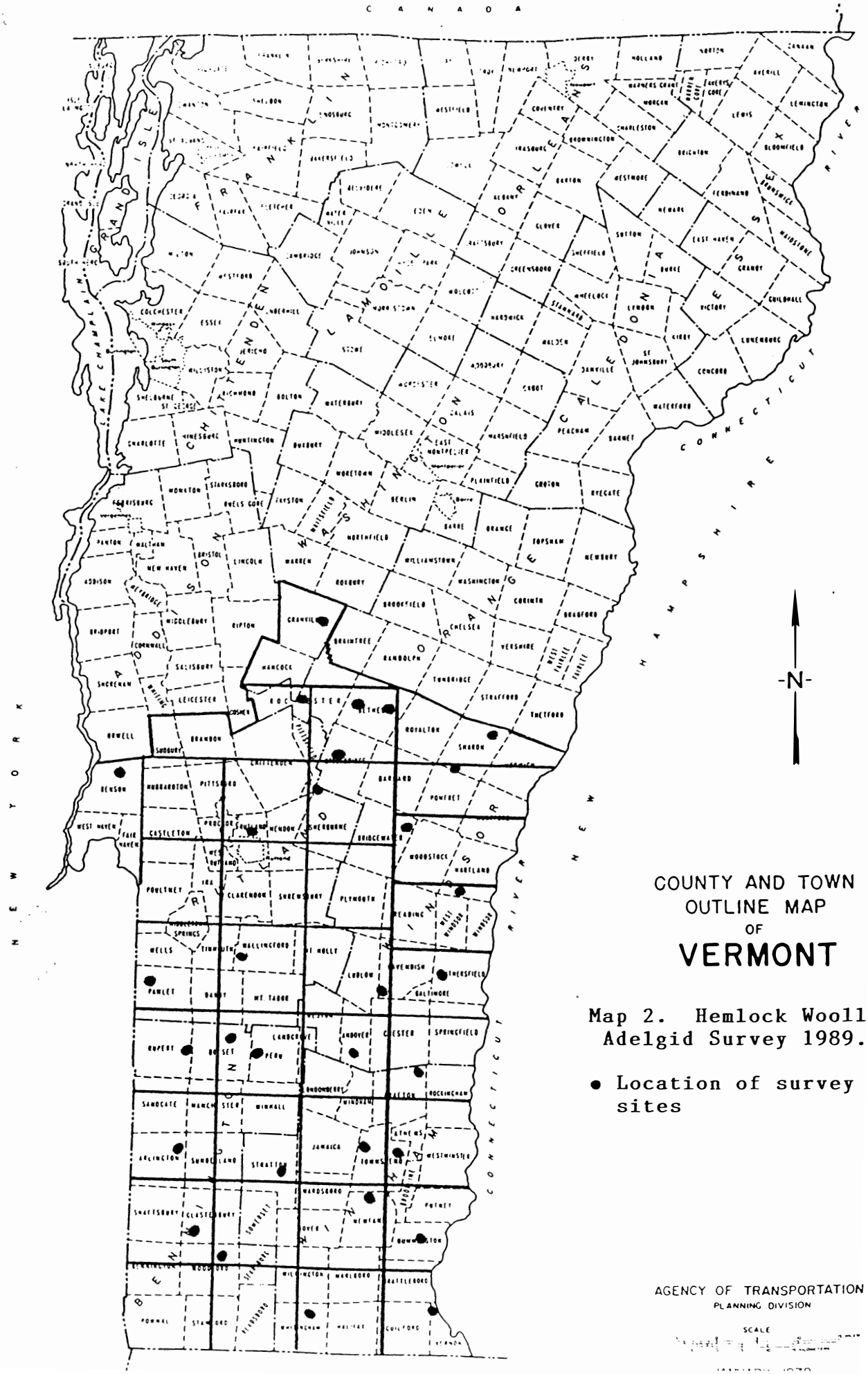
CANADA
NEW YORK
CONNECTICUT RIVER
CONNECTICUT
HAMPSHIRE
-N-
COUNTY AND TOWN
OUTLINE MAP
OF
VERMONT
Map 2. Hemlock Woolly
Adelgid Survey 1989.
• Location of survey
sites
AGENCY OF TRANSPORTATION
PLANNING DIVISION
SCALE

OTHER SAPSUCKING INSECTS, MIDGES AND MITES

INSECT	HOST(S)	LOCALITY	REMARKS
Aphids Cinara sp.	White Pine	Wilmington Whitingham	Ornamentals and Christmas trees.
Aphids Periphyllus sp.			
Balsam Gall Midge Paradiplosis tumifex	Balsam Fir	Whitingham Ludlow	Light damage to Christmas trees. Increase from 1988.
Balsam Twig Aphid Mindarus abietinus	Balsam Fir	Widespread, Scattered	Increasing, but only light damage to Christmas trees.
Balsam Woolly Adelgid Adelges piceae	Balsam Fir	Chittenden	Ornamental.
Beech Scale Cryptococcus fagisuga			See Beech Bark Disease.
Cooley Spruce Gall Adelgid Adelges cooleyi	Douglas Fir White Spruce	Wells Pownal Pittsford	Light damage to Christmas trees.
Eastern Spruce Gall Adelgid Adelges abietis	White Spruce Red Spruce	Throughout	Occasional heavy damage to Christmas trees and ornamentals. Unevenly distributed in plantations, with up to 30% of tree heavily damaged.
Green Erineum Gall Eriophyidae	Sugar Maple	Windham County	Ornamental.
Hemlock Woolly Adelgid Adelges tsugae			See narrative.

OTHER SAPSUCKING INSECTS, MIDGES AND MITES

INSECT	HOST(S)	LOCALITY	REMARKS
Lacebugs *Corythucha* sp.	Hardwoods	Widespread	Damage particularly common on red oak and and red maple.
Maple Spindle Gall *Vasates aceris-crummena*	Sugar Maple	Rutland	Light damage.
Oystershell Scale *Lepidosaphes ulmi*	Beech	Rutland County	Heavier than 1988.
Pear Thrips *Taeniothrips inconsequens*			See narrative.
Pine Bark Aphid *Pineus strobi*	White Pine	Townshend Brattleboro	Associated with chlorotic Christmas trees and declining ornamentals.
Pine Needle Midge *Contarinea baeri*			Not observed.
Pine Spittlebug *Aphrophora parallela*	White Pine	Throughout	Spittle masses very heavy in places. No flagging observed.
Root Aphid *Prociphilus americanus*			Not observed.
Spruce Spider Mite *Oligonychus ununguis*	Balsam Fir White Spruce	Springfield Whitingham Baltimore	Occasional moderate damage, to Christmas trees, but less than 1988. Few eggs present on damaged twigs.

VI

BUD, SHOOT & STEM INSECTS

INSECT	HOST(S)	LOCALITY	REMARKS
Allegheny Mound Ant *Formica exsectoides*	White Pine	Whitingham	Several trees girdled.
Balsam Shootboring Sawfly *Pleroneura brunneicornis*			Not observed.
Northern Pine Weevil *Pissodes approximatus*	White Pine	Whitingham	Caused tree to snap.
Pales Weevil *Hylobius pales*	Balsam Fir	Hancock	Rochester Ranger District.
White Pine Weevil *Pissodes strobi*	White Pine Scots Pine	Throughout	Damage common. Feeding injury causing flagging on Scots pine Christmas trees.

BARK BEETLES

INSECT	HOST(S)	LOCALITY	REMARKS
Ambrosia Beetles Scolytidae	Sugar Maple	Townshend	On stressed ornamentals.
Eastern Ash Bark Beetles Hylesinus aculeatus	White Ash	Cavendish	On dying trees.
Hemlock Borer Melanophila fulvoguttata	Hemlock	Townshend Dummerston	Opening stand in vicinity of lightening strikes.
Pine Engraver Ips pini	White Pine	Grafton	Causing mortality on wet site.
Red Turpentine Beetle Dendroctonus valens	Red Pine	Chester	Associated with mortality on ledgey site.
Scolytids	White Pine	Mt. Holly	Associated with mortality of trees planted too deep.

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FOREST DISEASES

STEM DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Beech Bark Disease *Cryptococcus fagisuga* and *Nectria coccinea* var. *faginata*	Beech	Throughout	Steady at low levels (Figure 4). Whitened trees occasionally seen in Bennington and Windham Counties.
Caliciopsis Canker *Caliciopsis pinea*	White Pine	Newfane Springfield	Heavy resin flow in overstocked pole and sawtimber stands.
Cytospora Canker *Leucostoma kunzei*	Blue Spruce	Rutland County	Ornamentals.
Dutch Elm Disease *Ceratocystis ulmi*	Elm	Throughout	Flagging and sudden mortality more common than usual.
Hypoxylon Canker *Hypoxylon pruinatum*	Poplar	Throughout	More concern than usual in Rutland County.
Maple Canker *Steganosporium* sp.	Sugar Maple	Windsor County	Causing occasional lower branch mortality. Damage much less than 1988.
Oak Wilt *Ceratocystis fagacearum*	Oaks	Absent	No suspects seen by trained observers during aerial flights.
Phomopsis Canker *Phomopsis arnoldiae*	Russian Olive	Marlboro	Hedgerow.
Phomopsis Gall *Phomopsis* sp.	Butternut	Brattleboro	Severe galling.

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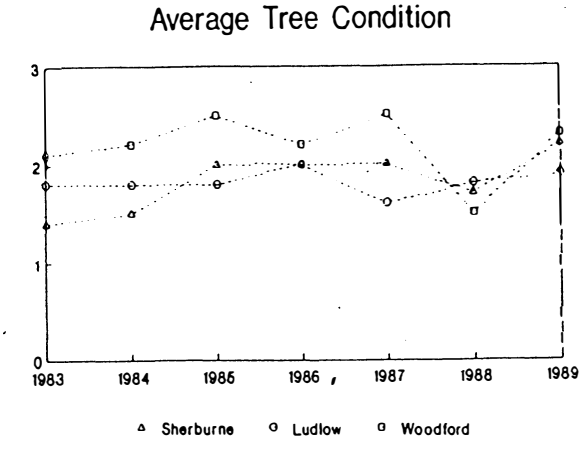
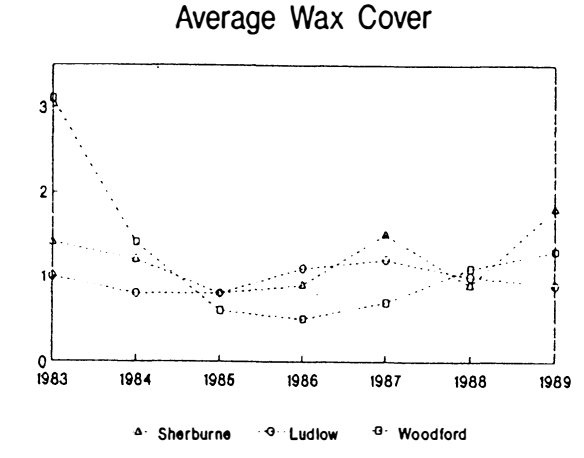
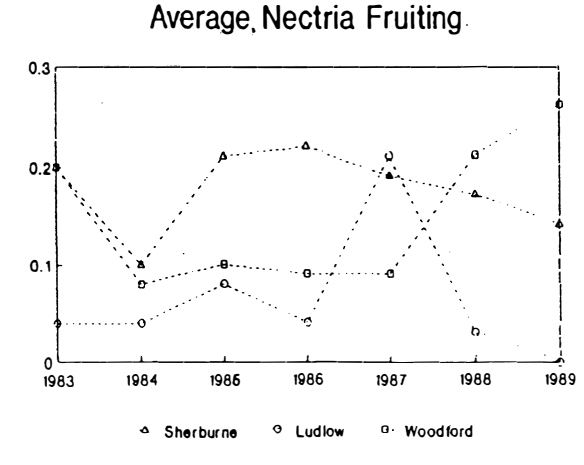
Figure 4. Summary of beech bark disease monitoring plots 1983-1989.



(1 Good, 2 Fair, 3 Poor, 4 Dead)



(0 None,1 Trace,2 Light,3 Mod,4 Heavy)



(0 None, 1 Sparse, 2 Moderate)

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STEM DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Scleroderris Canker *Asocalyx abietina*	Pines	Absent	Never detected in the region.
Smooth Patch *Dendrothele macrodens*	Ash	Chester	Slow-growing trees.
Verticillium Wilt *Verticillium albo-atrum* or *V. dahliae*	Sugar Maple	Rutland	Park trees.
White Pine Blister Rust *Cronartium ribicola*	White Pine	Throughout	More common than usual.
Woodgate Gall Rust *Endocronartium harknessii*	Scots Pine	Pittsford	Ornamentals.

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Foliage Diseases

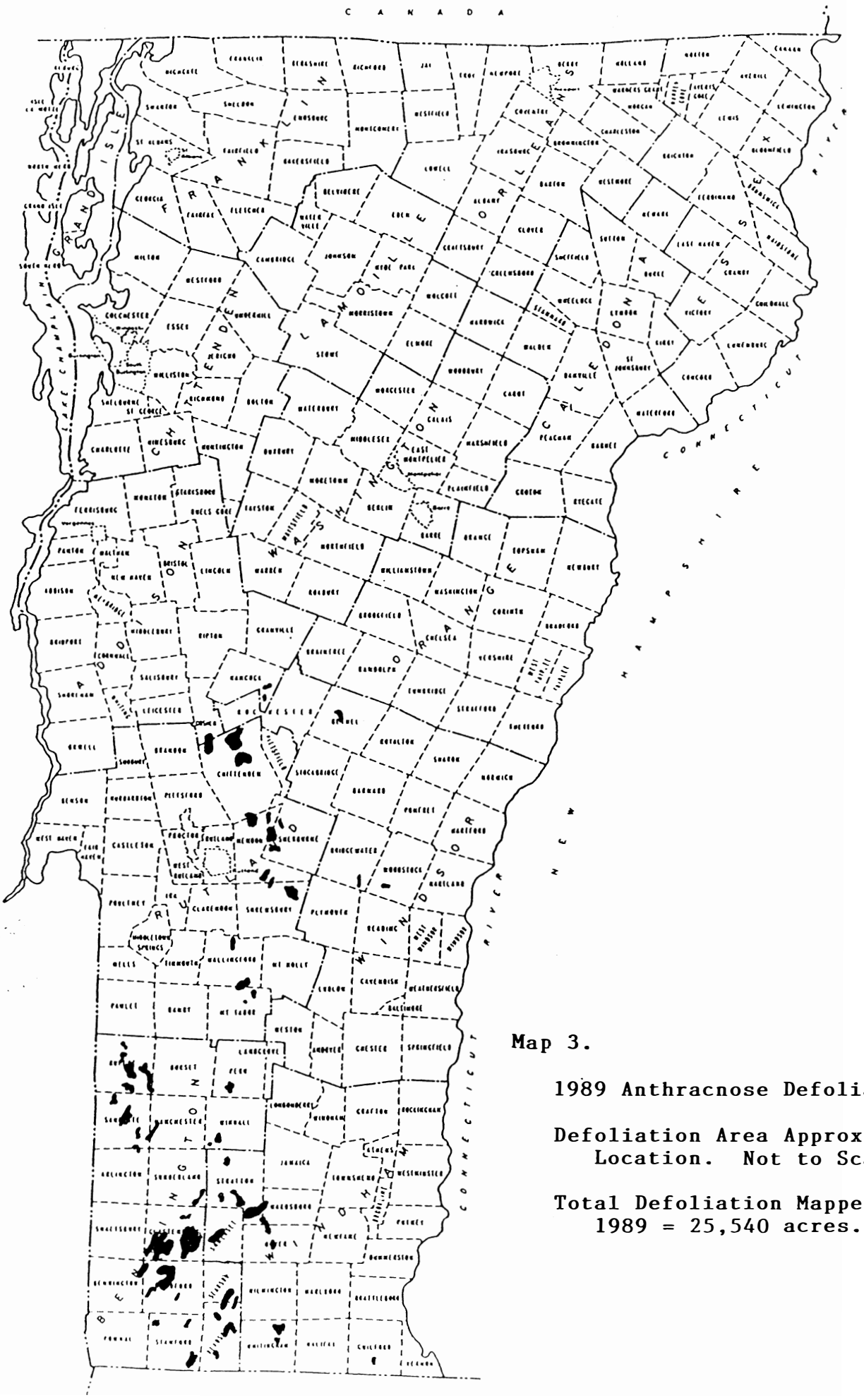
Anthracnose, Gloeosporium spp., caused widespread defoliation of sugar maple. The first period of defoliation followed heavy rains in May and June. Ash and birch were among the other species affected. In mid-July, 25,540 acres of defoliation were mapped in the region (Table 6, Map 3). Damage was most obvious at higher elevations, particularly in saddles and draws. Refoliation occurred by late July where damage was heavy.

Table 6. Acres of defoliation by anthracnose mapped during mid-July aerial surveys.

Location	Acres Defoliated	Location	Acres Defoliated
Hancock	250	Chittenden	2500
		Mendon	800
Addison County	250	Mt. Tabor	200
		Sherburne	400
Glastonbury	4000	Shrewsbury	350
Manchester	300	Wallingford	520
Peru	410		
Readsboro	860	Rutland County	4770
Rupert	1550		
Sandgate	900	Dover	320
Searsburg	470	Guilford	210
Stamford	900	Somerset	1090
Sunderland	500	Stratton	3180
Winhall	1370	Wardsboro	230
Woodford	3700	Whitingham	270
Bennington County	14960	Windham County	5300
		Bethel	170
		Bridgewater	50
		Woodstock	40
		Windsor County	260

Total Acres Defoliated: Southern Vermont 25,540.

A second period of widespread anthracnose on sugar maple occurred following heavy rains in mid-August. The heaviest damage was in northern Windsor County. Trees along breaks in the canopy and understory trees were most severely affected.



Map 3.

1989 Anthracnose Defoliation

Defoliation Area Approximate Location. Not to Scale.

Total Defoliation Mapped in 1989 = 25,540 acres.

VI

OTHER FOLIAGE DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Anthracnose *Gloeosporium* spp.			See narrative.
Apple Scab *Venturia inequalis*	Apple	Westminster Ludlow	Ornamentals.
Cyclaneusma Needlecast *Cyclaneusma minor*	Scots Pine	Throughout	Heavy damage to Christmas trees in Shaftsbury.
Fir-Fern Rust *Uredinopsis mirabilis*	Concolor Fir	Essex	Nursery.
Lophodermium Needlecast *Lophodermium seditiosum*	Scots Pine	Rutland	Small Christmas tree plantation.
Phomopsis Blight *Phomopsis juniperovora*	Andorra Juniper	Rutland Clarendon	Ornamentals.
Phyllosticta Leaf Spot *Phyllosticta* sp.	Catalpa	Westminster	Ornamental.
Rhabdocline Needlecast *Rhabdocline pseudotsugae*	Douglas Fir	Throughout	In general, less damage than in 1987-88, probably due to increased control effort. Wet spring conditions made spray timing difficult. Heavy damage to Christmas trees in Rupert.

OTHER FOLIAGE DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Rhizosphaera Needlecast *Rhizosphaera kalkhoffi*	Blue Spruce White Spruce	Bennington County	Especially common on ornamentals where air drainage is poor.
Swiss Needlecast *Phaeocryptopus gaumanni*			Not observed.

VT

ROOT ROTS

DISEASE	HOST(S)	LOCALITY	REMARKS
Annosus Root Rot *Heterobasidion annosum*	Norway Spruce	Stockbridge	Plantation.
Shoestring Root Rot *Armillaria mellea*	Red Spruce Hemlock	Throughout Townshend Dummerston	Symptomatic trees much less common than previous years. Killing hemlocks in vicinity of trees struck by lightening.
Xylaria Root Rot *Xylaria* sp.	Hardwoods	Widespread	Dead man's fingers were commonly seen around ornamentals and forest trees.

DIEBACKS, DECLINES & ENVIRONMENTAL DISEASES

AIR POLLUTION continues to be a concern. A study to determine the potential impact of ozone on vegetation in the Lye Brook Wilderness area was established on Mt. Equinox under the leadership of Gretchen Smith, University of Massachusetts.

ASH DIEBACK continues to cause losses. Epicormic sprouts on symptomatic trees, in a northern hardwood stand in Whitingham, suggest that dieback can be attributed to MLO at higher elevations, in addition to lower elevations where its presence has been confirmed.

BIRCH DECLINE continues in some areas, although no new areas were reported.

FROST DAMAGE was not observed.

DROUGHT conditions in 1988 and lack of snowcover contributed to widespread losses of recently planted conifers. Seedlings already under water stress were particularly vulnerable to drying winter winds. Improper planting and poor site conditions contributed to mortality although losses also occurred to thrifty trees with good root development. Spruce was the species most severely affected. The Agricultural Stabilization and Conservation Service provided partial reimbursement to qualifying Christmas tree growers who sustained losses greater than 35%.

IMPROPER PLANTING continues to cause tree mortality, and contributed to drought stress. Balsam fir Christmas trees (Baltimore) and white spruce and white pine ornamentals (Brattleboro, Mt. Holly) were among the species affected by planting too deep. Excessive mulching can exacerbate this problem. Losses were extensive in one plantation (Wells) where large Douglas-fir seedlings, with poor root:shoot ratio were planted for Christmas trees.

LARCH DECLINE may increase following this year's outbreak of larch casebearer.

MAPLE DECLINE continues to be a concern, especially where no specific stress factors can be identified. Root samples, taken from six symptomatic trees in Dummerston, were tested for MLO (using DAPI techniques) by Wayne Sinclair at Cornell University. No MLOs were detected.

In general, maples appeared healthier than normal this year. Above average rainfall contributed to dense foliage and the highest levels of starch since 1987 (see Pear Thrips). However, dieback is still common, and tapholes close slowly in many sugarbushes. Sugarmakers remain interested in whether or not fertilization will slow the development of decline symptoms or improve the rate of recovery. Several sugarbushes in the region were aerially fertilized this year.

NUTRIENT DEFICIENCY is thought to be the cause of chlorosis at the end of white spruce shoots. This symptom is common in Christmas trees and was extensive in one plantation in Dummerston.

THINNING SHOCK may lead to dieback where trees fail to respond to selective cutting. This is most severe where weaker trees have been left or site conditions are poor.

WET FEET initiated decline in scattered locations. Where soil conditions force roots to grow near the surface, trees were more vulnerable to last year's drought conditions. Symptoms showed up this year, with secondary agents building in some locations. Pole-sized white pine (Grafton) and Balsam fir Christmas trees (Wells) were among the species affected.

WHITE PINE NEEDLE BLIGHT was not observed.

WINTERBURN was common on recently transplanted conifers because there was no snowcover, and plant tissues were dry going into the winter. Severe desssication led to mortality in some plantations (see Drought).

WOUNDING continues to cause decline and mortality. Mowing damaged Christmas tree in Wells. Construction and lawnmower injury to ornamentals were common.

V+

ANIMAL DAMAGE

ANIMAL	SPECIES DAMAGED	LOCALITY	REMARKS
Deer	Hardwoods	Rupert Danby	Heavy browse.
Grosbeaks	Sugar Maple	Grafton	Bud damage.
Mouse			Not observed.
Porcupine	Apples Telephone line	Castleton Pico	New orchard. NEPCO.
Squirrel	Sugar Maple	Brattleboro	Buds clipped.
	Tubing	Poultney	Heavy damage.